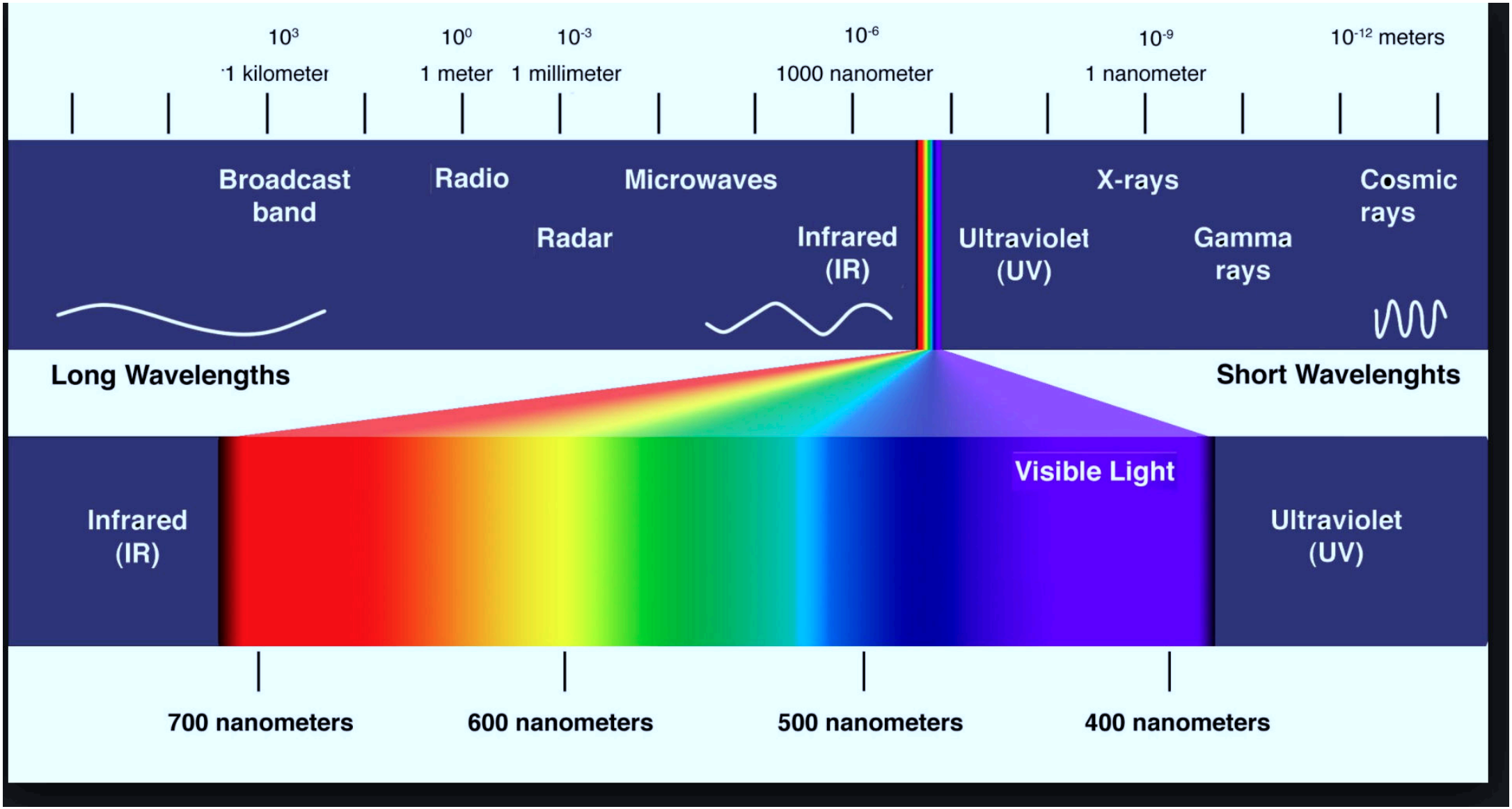
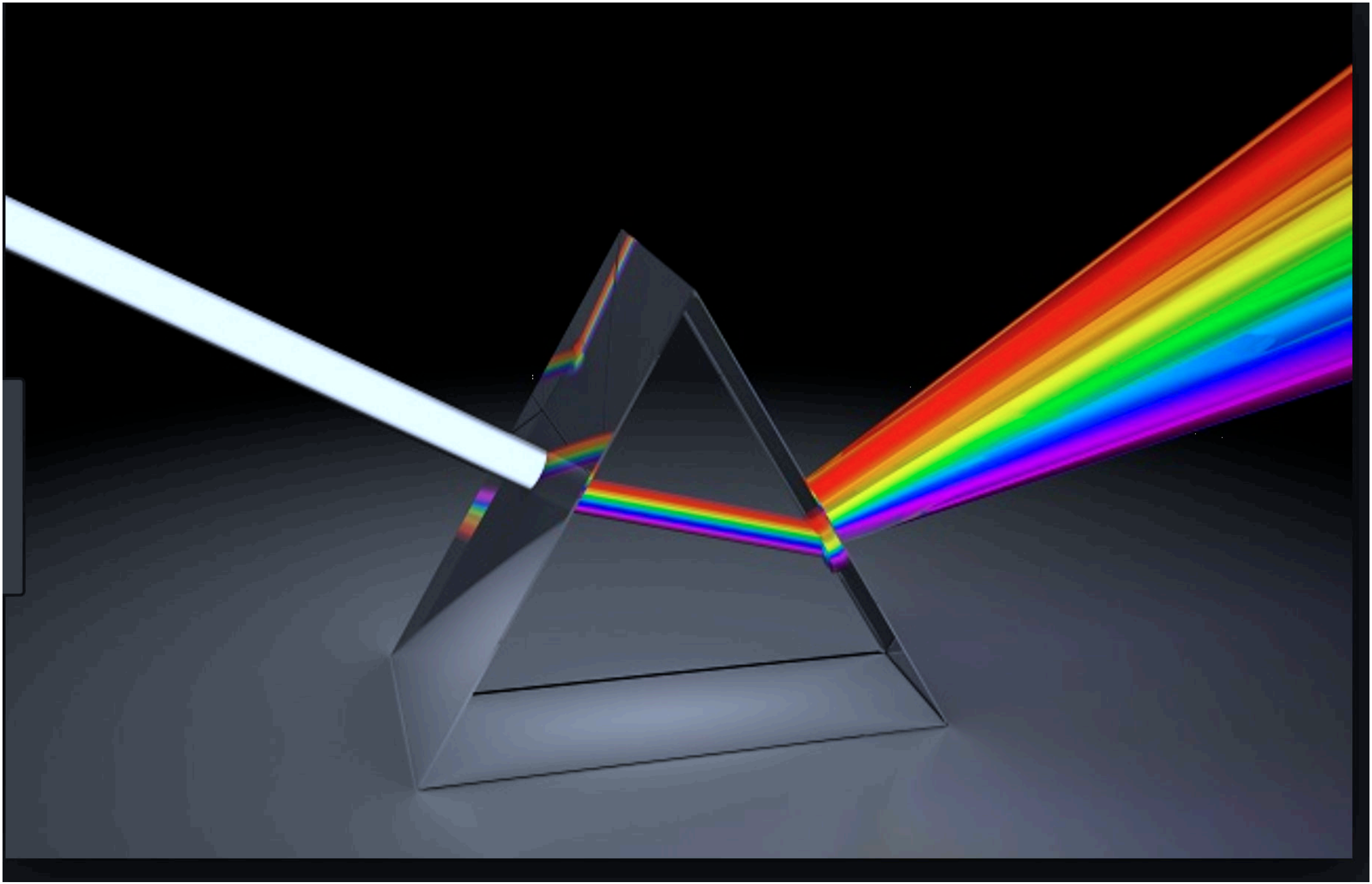
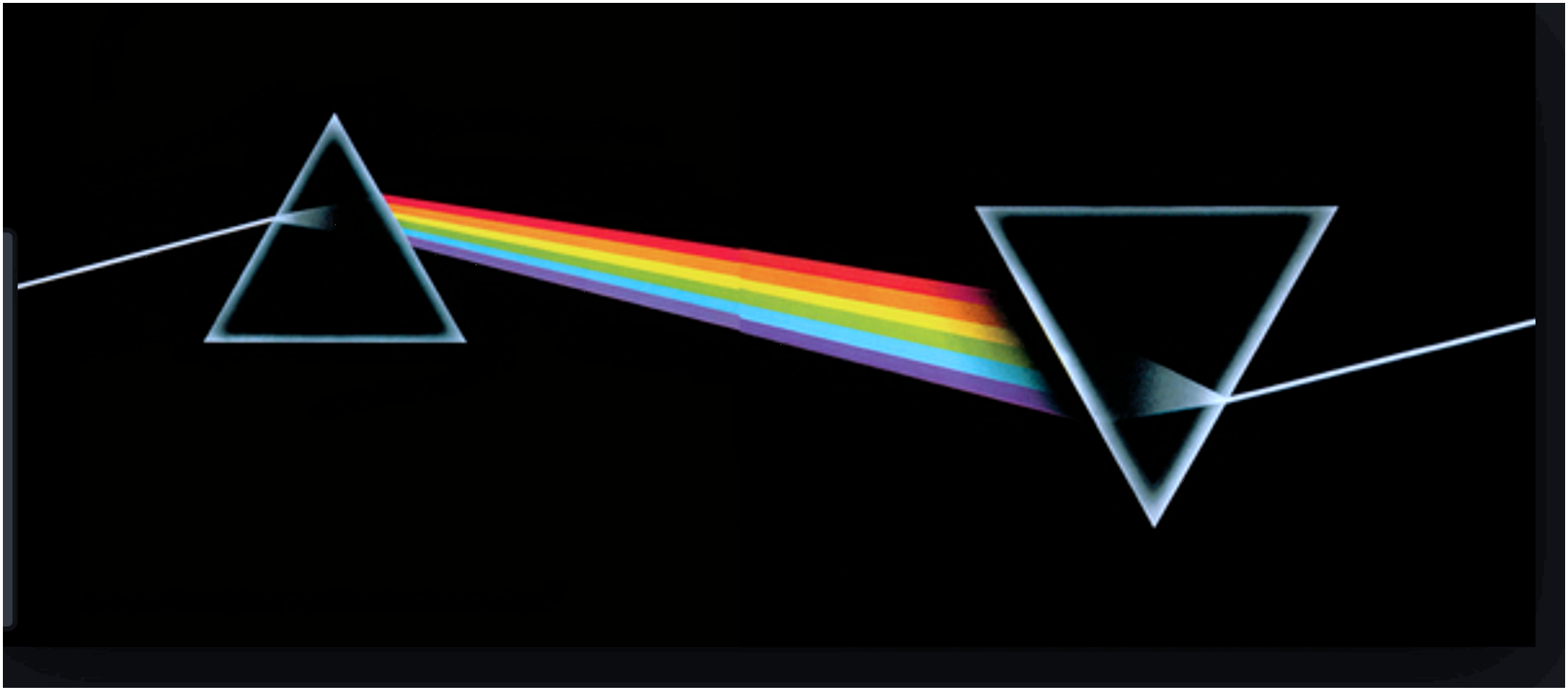
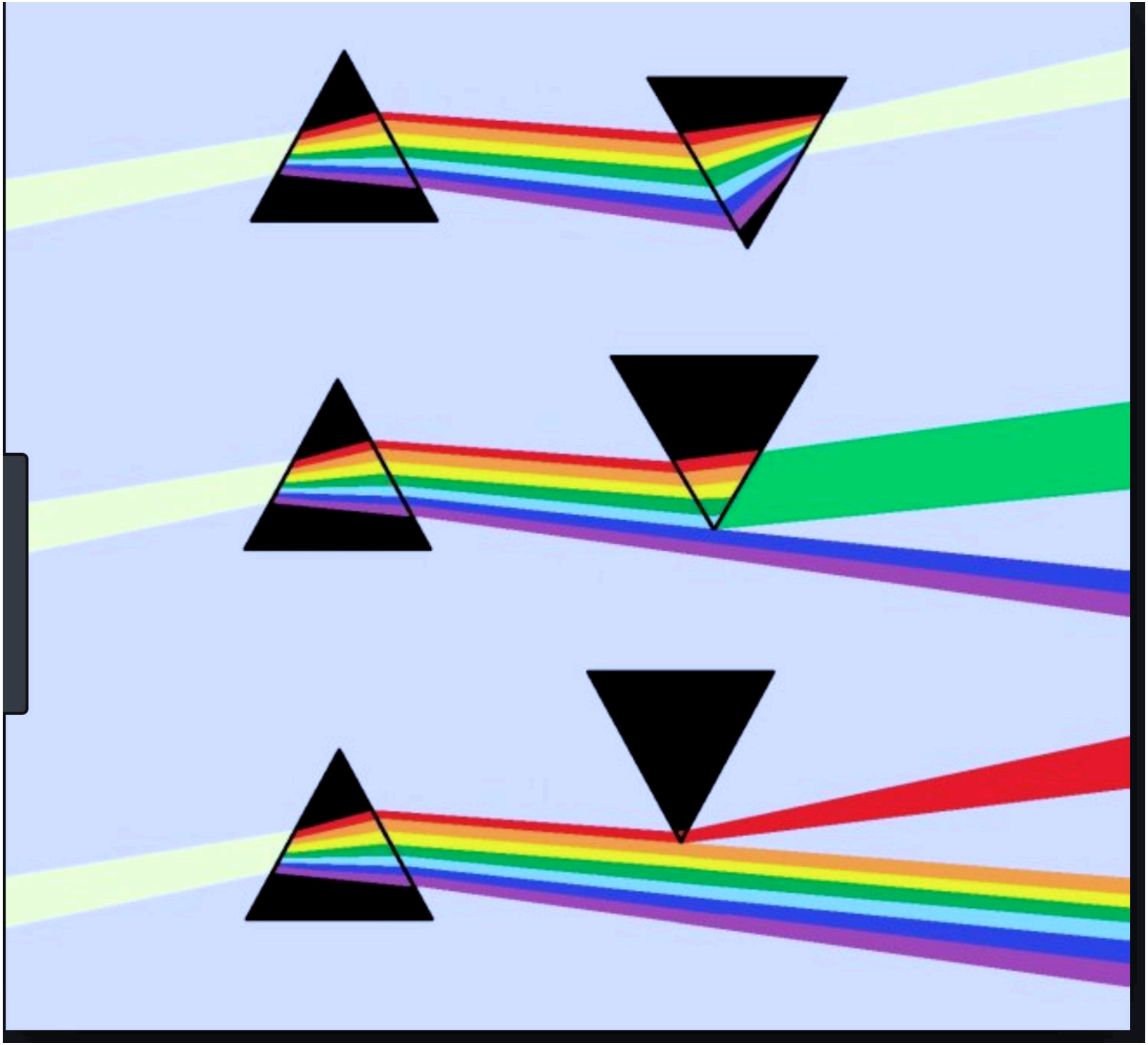
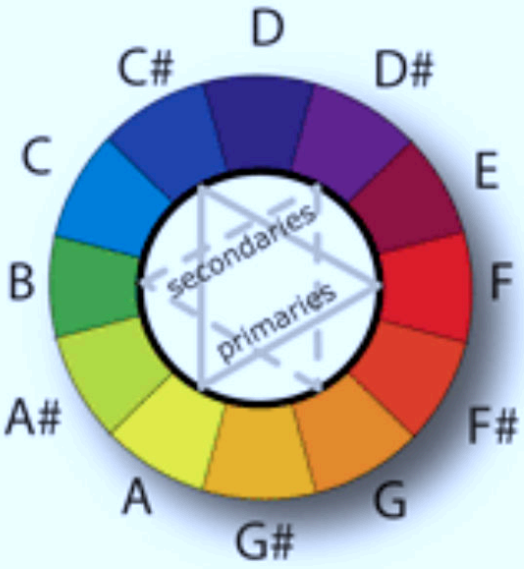

10^{3}
1 kilometer
10^{0}
1 meter
10^{-3}
1 millimeter
10^{-6}
1000 nanometer
10^{-9}
1 nanometer
10^{-12} meters
Broadcast band
Radio
Microwaves
Radar
Infrared (IR)
Ultraviolet (UV)
X-rays
Gamma rays
Cosmic rays
Long Wavelengths
Short Wavelenghts
Infrared (IR)
Visible Light
Ultraviolet (UV)
700 nanometers
600 nanometers
500 nanometers
400 nanometers









Color spectrum to logarithmic octave mapping

(using $2^{1/12}$ log spacing in terahertz mapped to {C} octave)

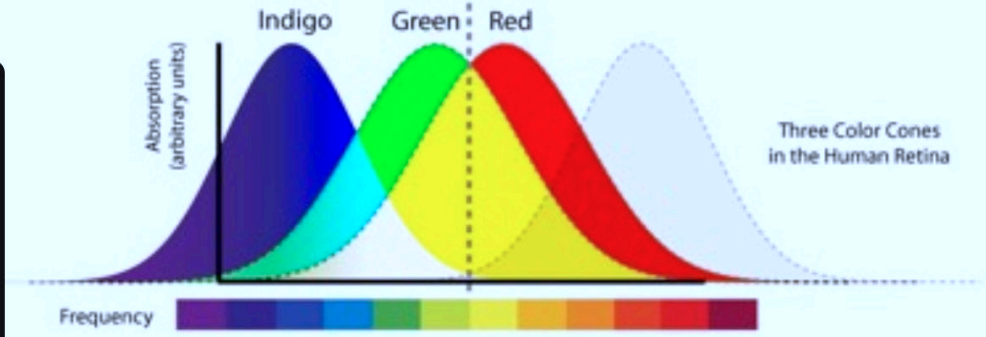
Tone	Color	Spectral Color Bands	$2^{1/12}$ Calculated Color Centers
D#	Purple		370.0000
E	Magenta		392.0013
F	Red	Red: 384-482	415.3110
F#	Red-orange		440.0066
G	Orange	Orange: 482-503	466.1708
G#	Yellow-orange		493.8907
A	Yellow	Yellow: 503-520	523.2590
A#	Yellow-green		554.3736
B	Green	Green: 520-610	587.3384
C	Cyan		622.2633
C#	Blue	Blue: 610-659	659.2651
D	Indigo		698.4670
D#	Violet	Violet: 659-750	740.0000
E	Purple		784.0027

2:1 color octave

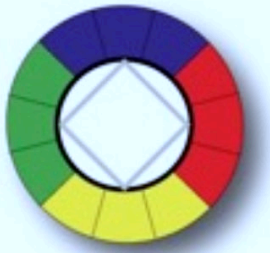
Copyright © 2008 Richard Merrick

Tone-Color Correspondence to a Double Octave

	C	C#	D	D#	E	F	F#	G	G#	A	A#	B	C	C#	D	D#	E	F	F#	G	G#	A	A#	B	C
Ratio	1:1	16:15	9:8	6:5	5:4	4:3	7:5	3:2	8:5	5:3	7:4	13:7	2:1	32:15	9:4	12:5	10:4	8:3	14:5	3:1	16:5	10:3	14:4	26:7	4:1
Degree	360°	337.5°	320°	300°	288°	270°	257.14°	240°	225°	216°	205.71°	193.85°	180°	168.75°	160°	150°	144°	135°	128.57°	120°	112.5°	108°	102.86°	96.92°	90°
Circle	0°	22.5°	40°	60°	72°	90°	102.86°	120°	135°	144°	154.29°	166.15°	180°	191.25°	200°	210°	216°	225°	231.43°	240°	247.5°	252°	257.14°	263.08°	270°
Hertz	256	273.07	288	307.02	320	341.33	358.4	384	409.6	426.67	448	475.43	512	546.13	576	614	640	682.67	716.8	768	819.2	853.33	896	950.86	1024

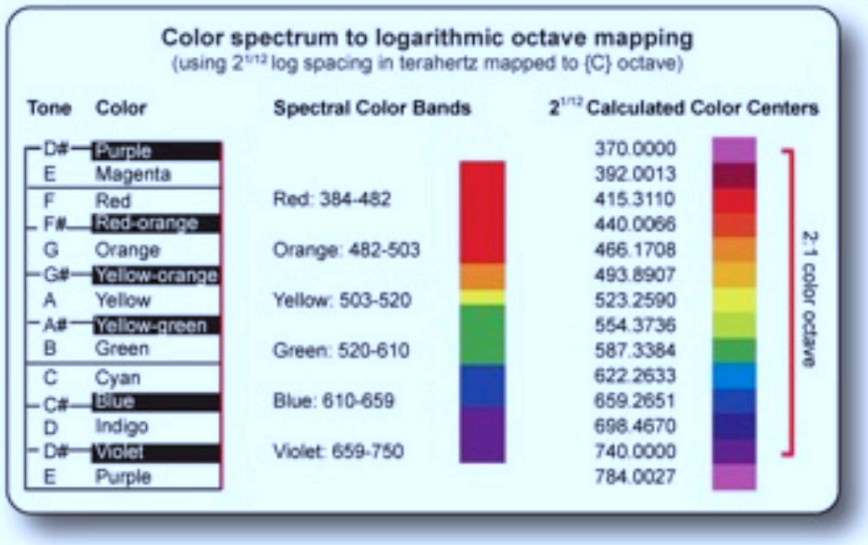


Three Color Cones in the Human Retina



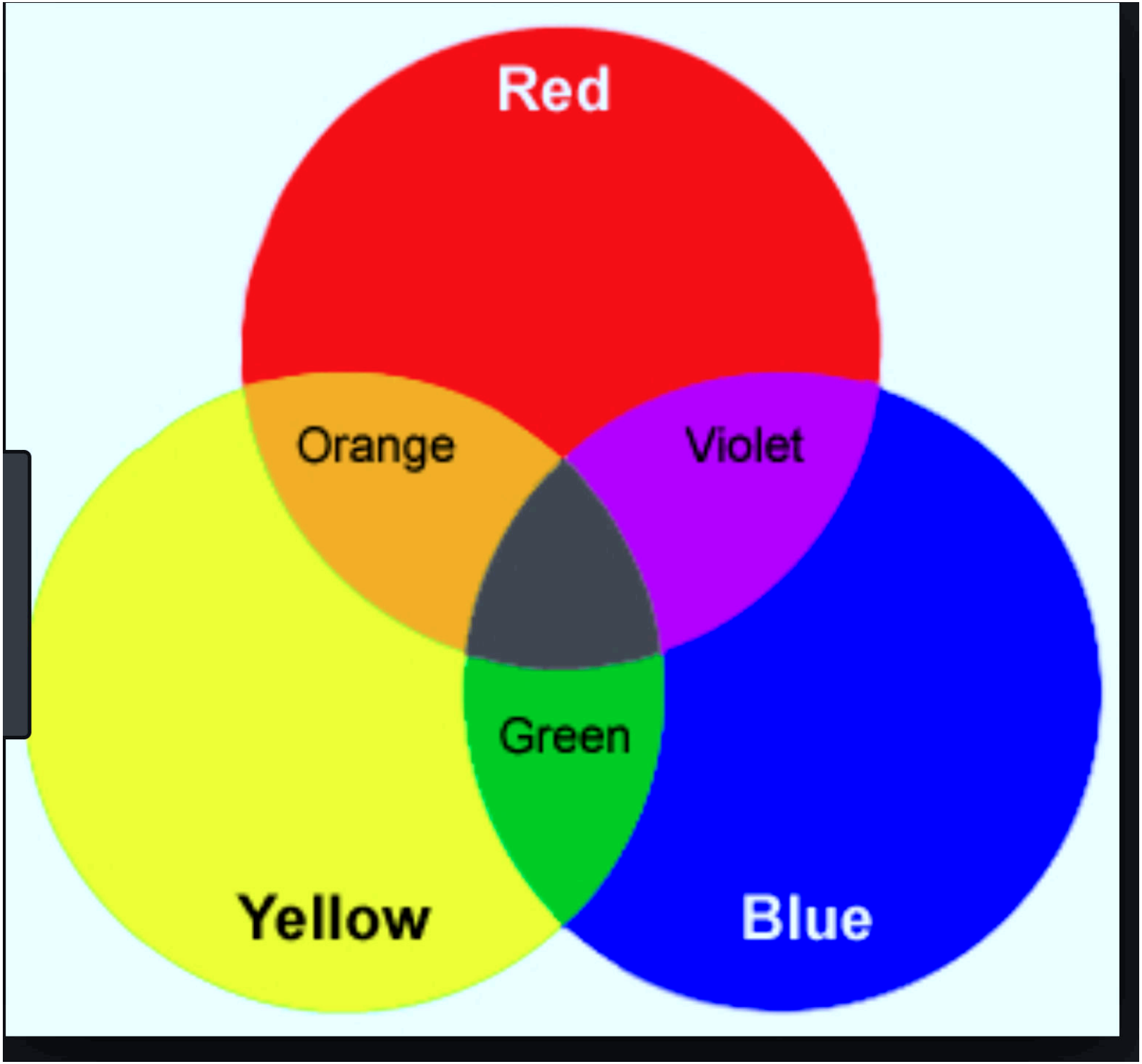
Color Symmetry

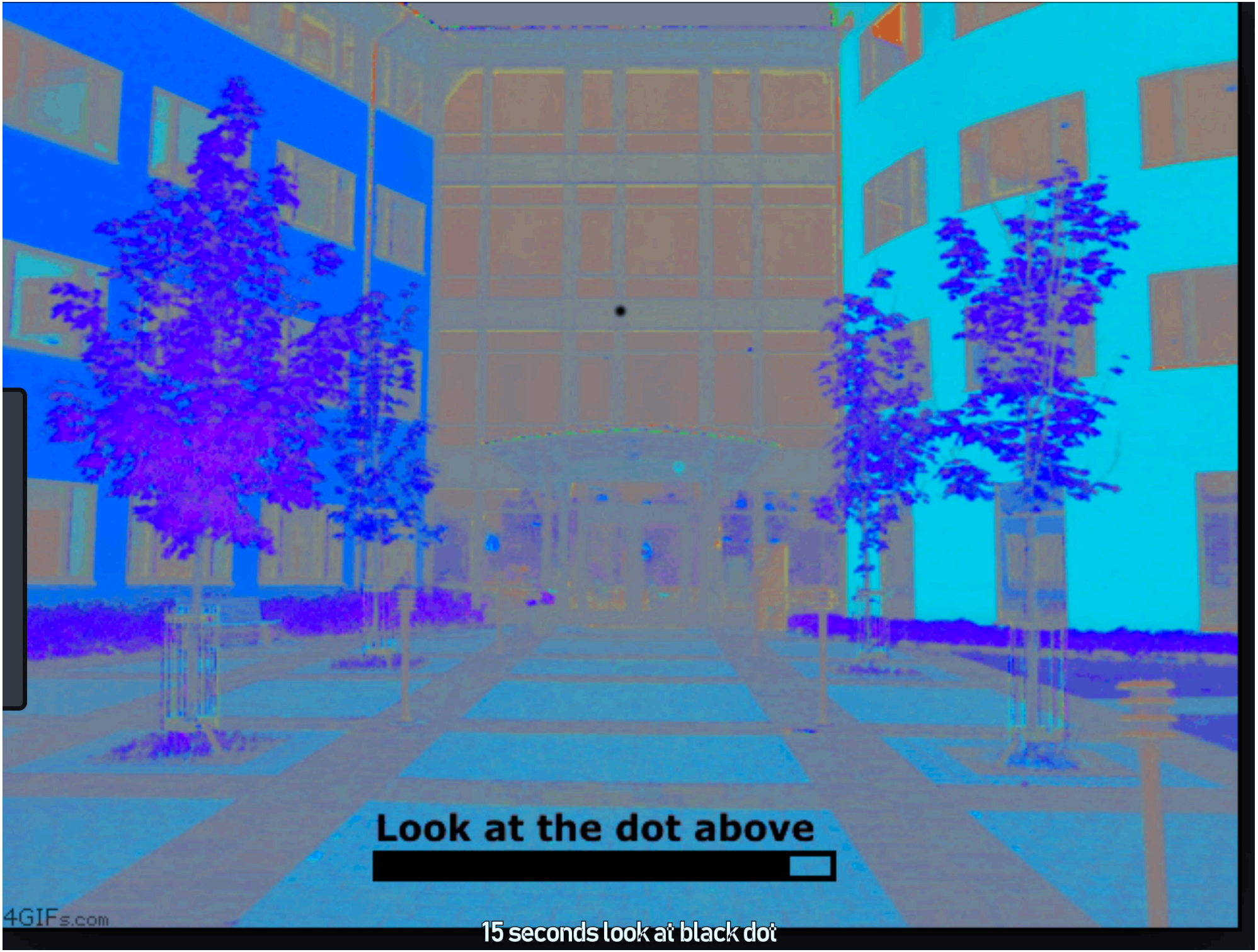
Perceptual Color Wheel



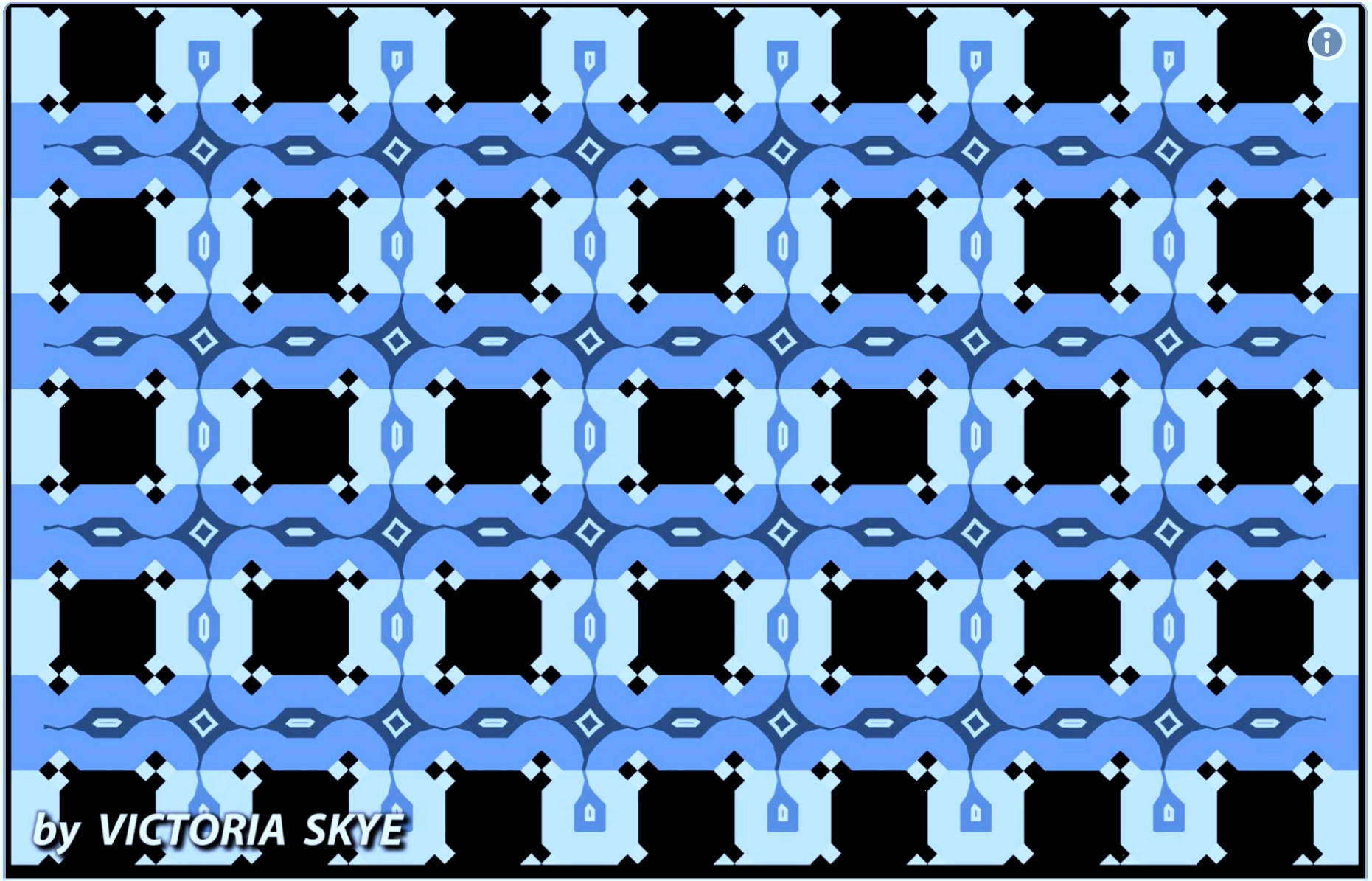
PURE SONOCHROMATIC SCALE		
(invisible)	Ultraviolet	Over 717.591 Hz
	Violet	607.542 Hz
	Blue	573.891 Hz
	Cyan	551.154 Hz
	Green	478.394 Hz
	Yellow	462.023 Hz
	Orange	440.195 Hz
	Red	363.797 Hz
(invisible)	Infrared	Below 363.797 Hz

SONOCHROMATIC MUSIC SCALE (basic 12/360)		
	Rose	**E**
	Magenta	**D#**
	Violet	**D**
	Blue	**C#**
	Azure	**C**
	Cyan	**B**
	Spring	**A#**
	Green	**A**
	Chartreuse	**G#**
	Yellow	**G**
	Orange	**F#**
	Red	**F**


Red
Orange
Violet
Green
Yellow
Blue

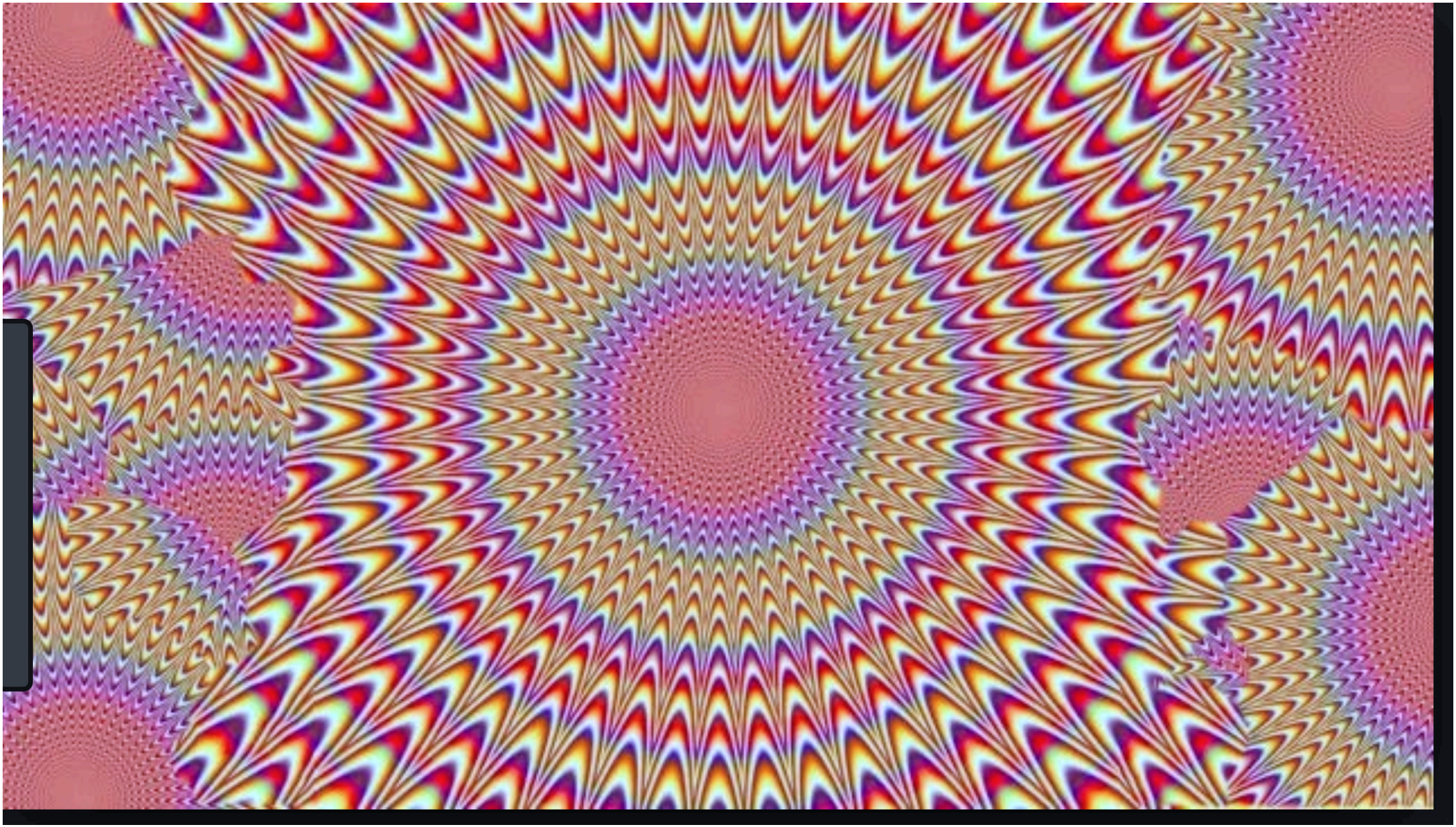

Look at the dot above
4GIFs.com
15 seconds look at black dot

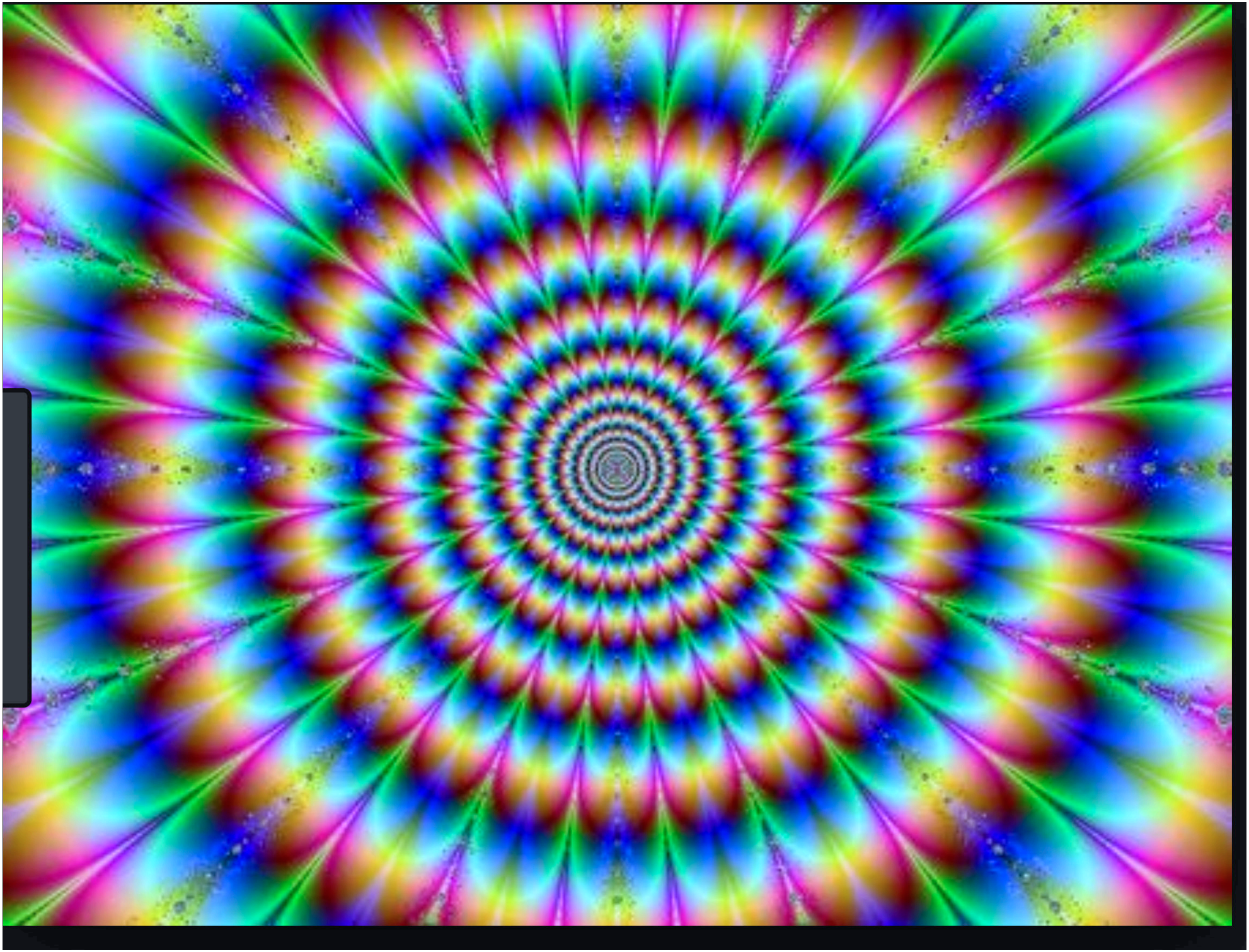
This IS a black and white image
but you DID see the colors of the walls,
didn't you?
4GIFs.com

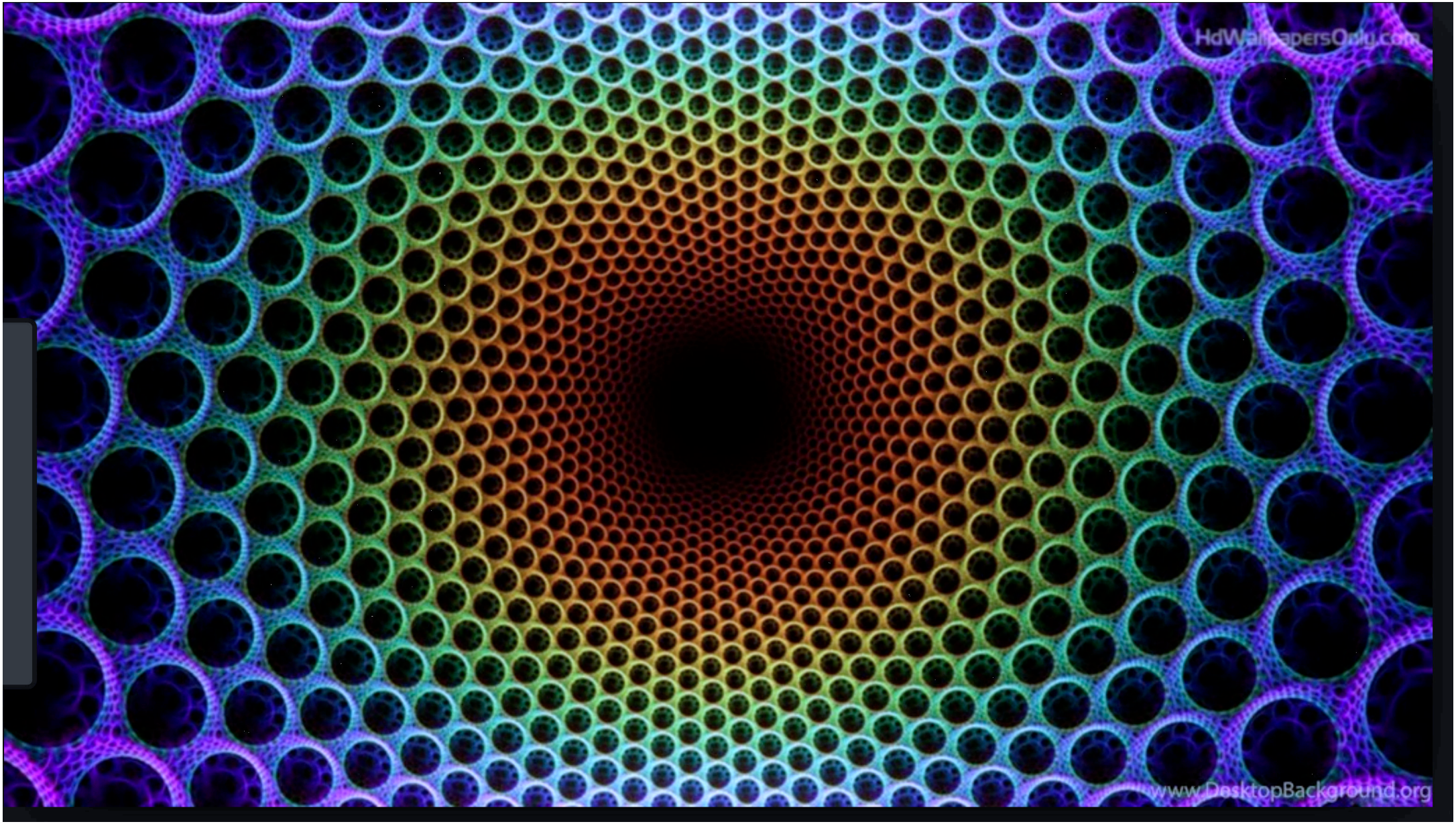


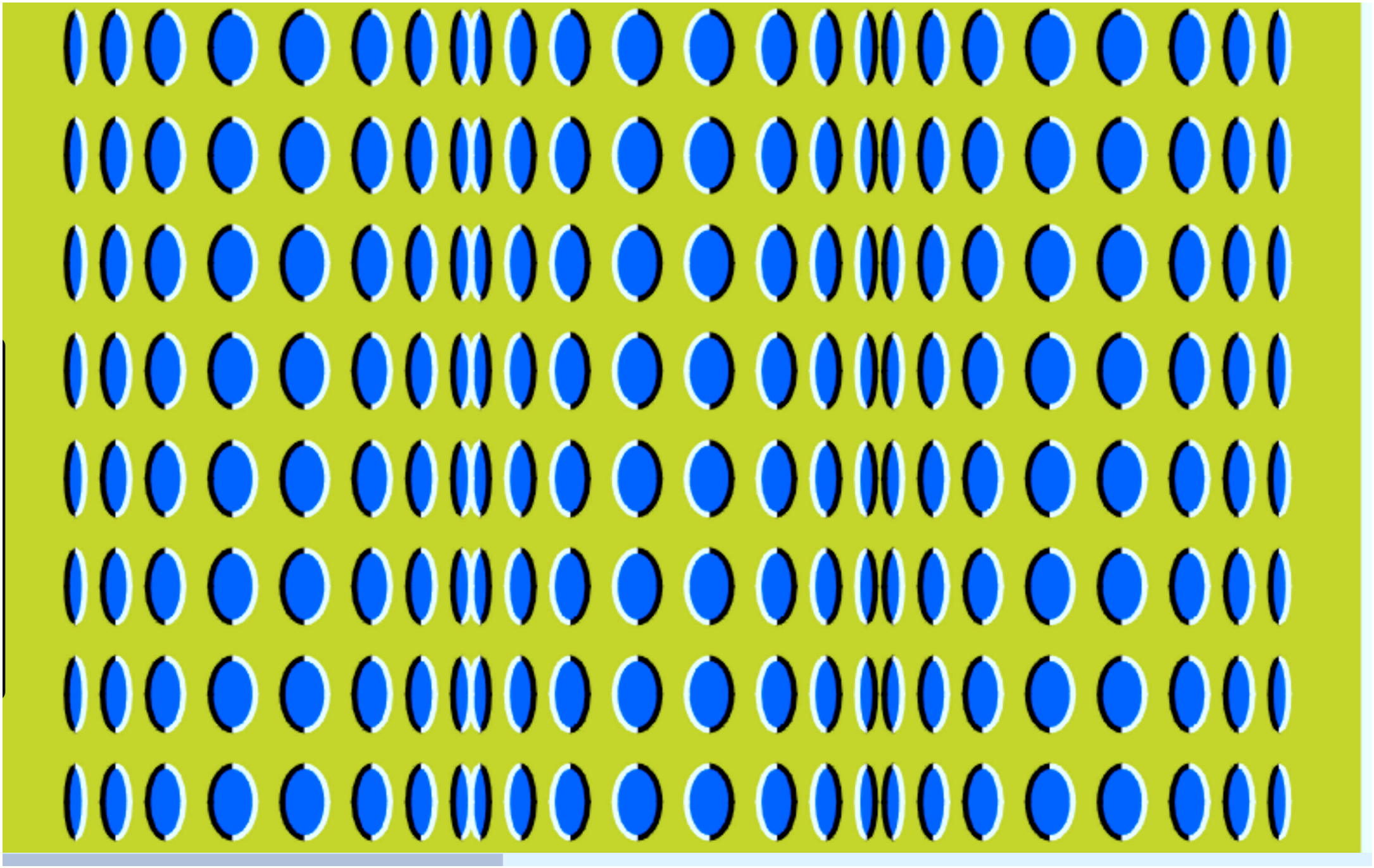
CAFE WALL OPTICAL ILLUSION

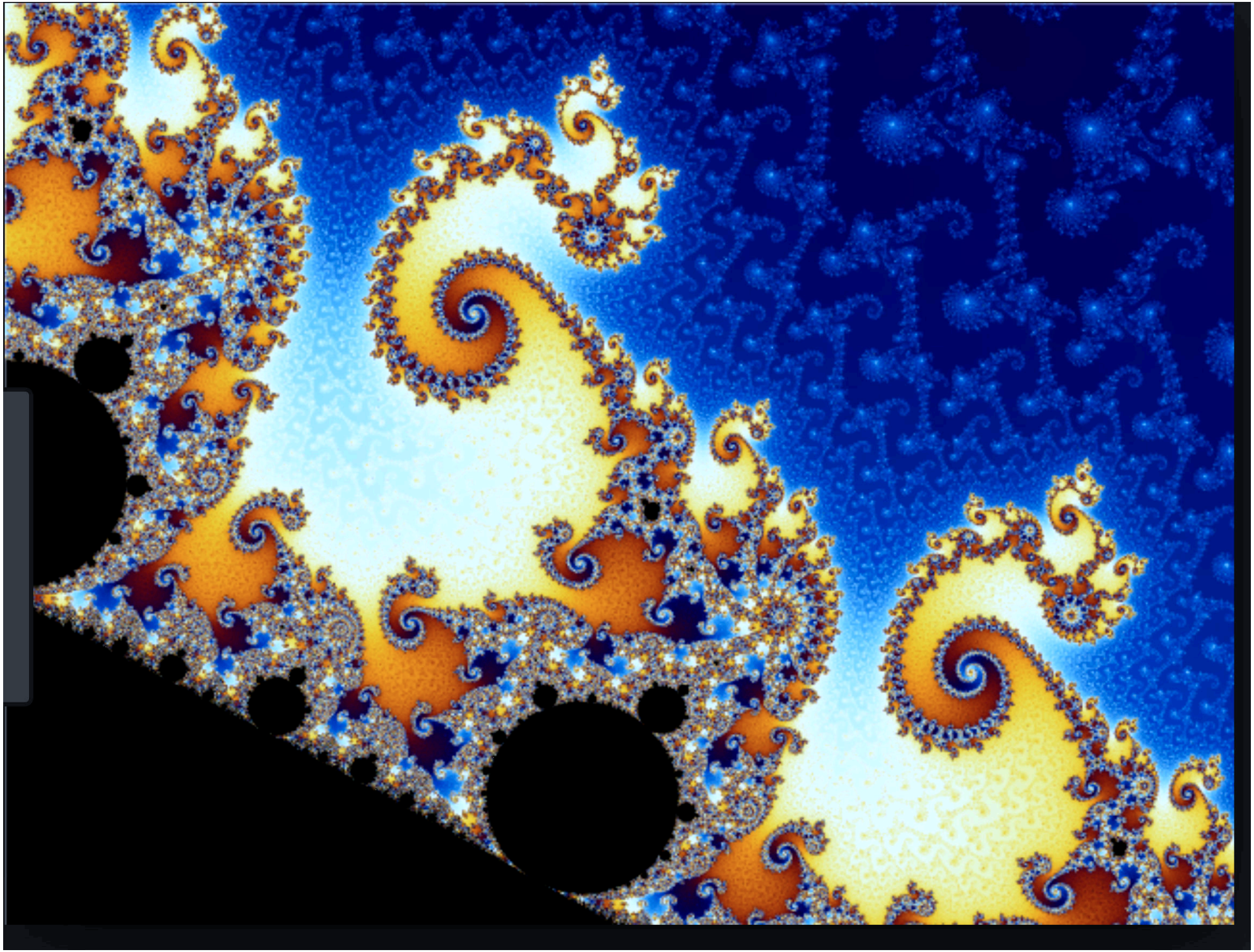
Do the horizontal bars look like they bend and are at an angle?
Look again, because they dont bend. They are straight and in parallel rows.
The alternating target patterns, rows and colors all combine to trick your brain.

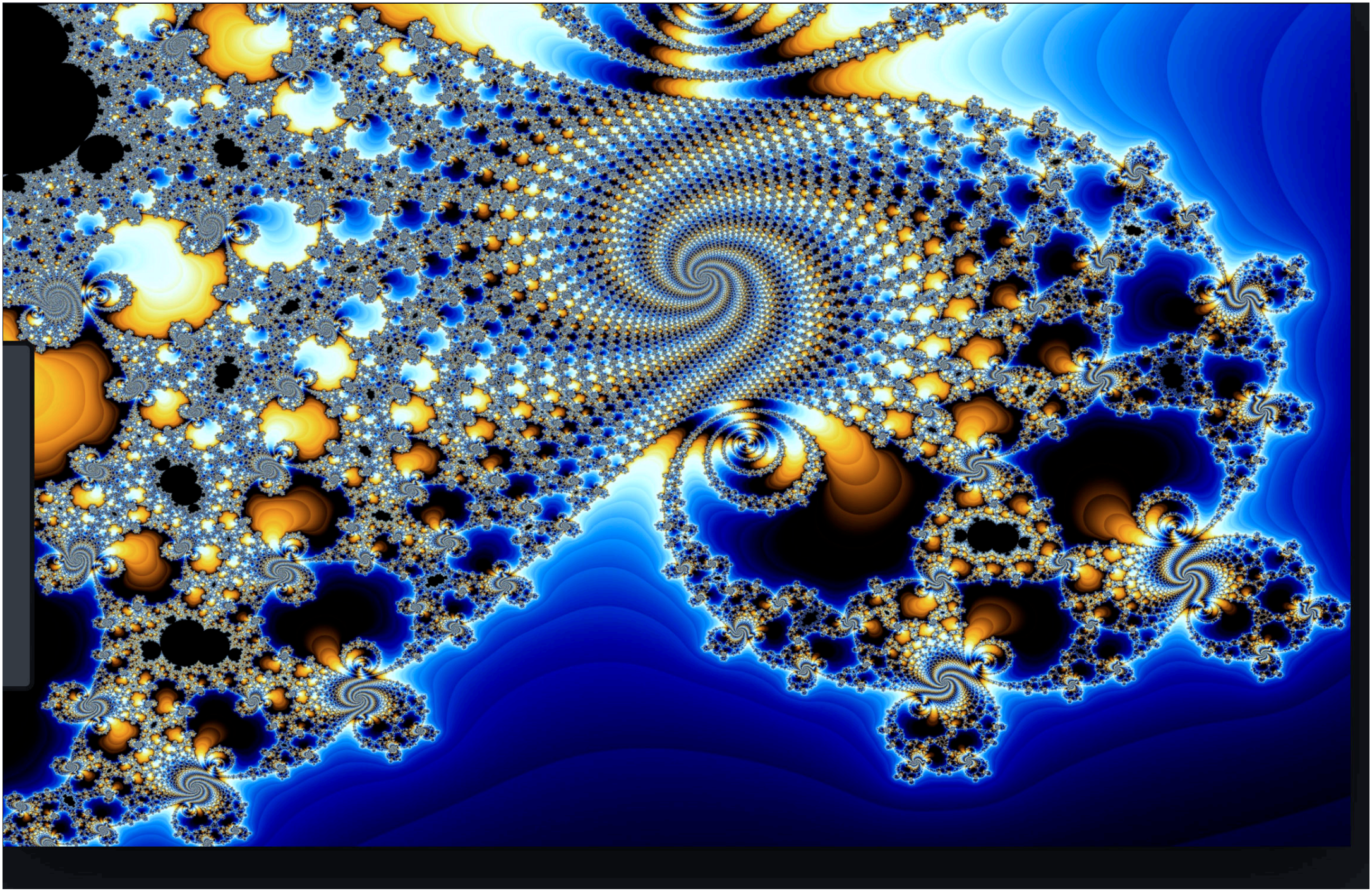


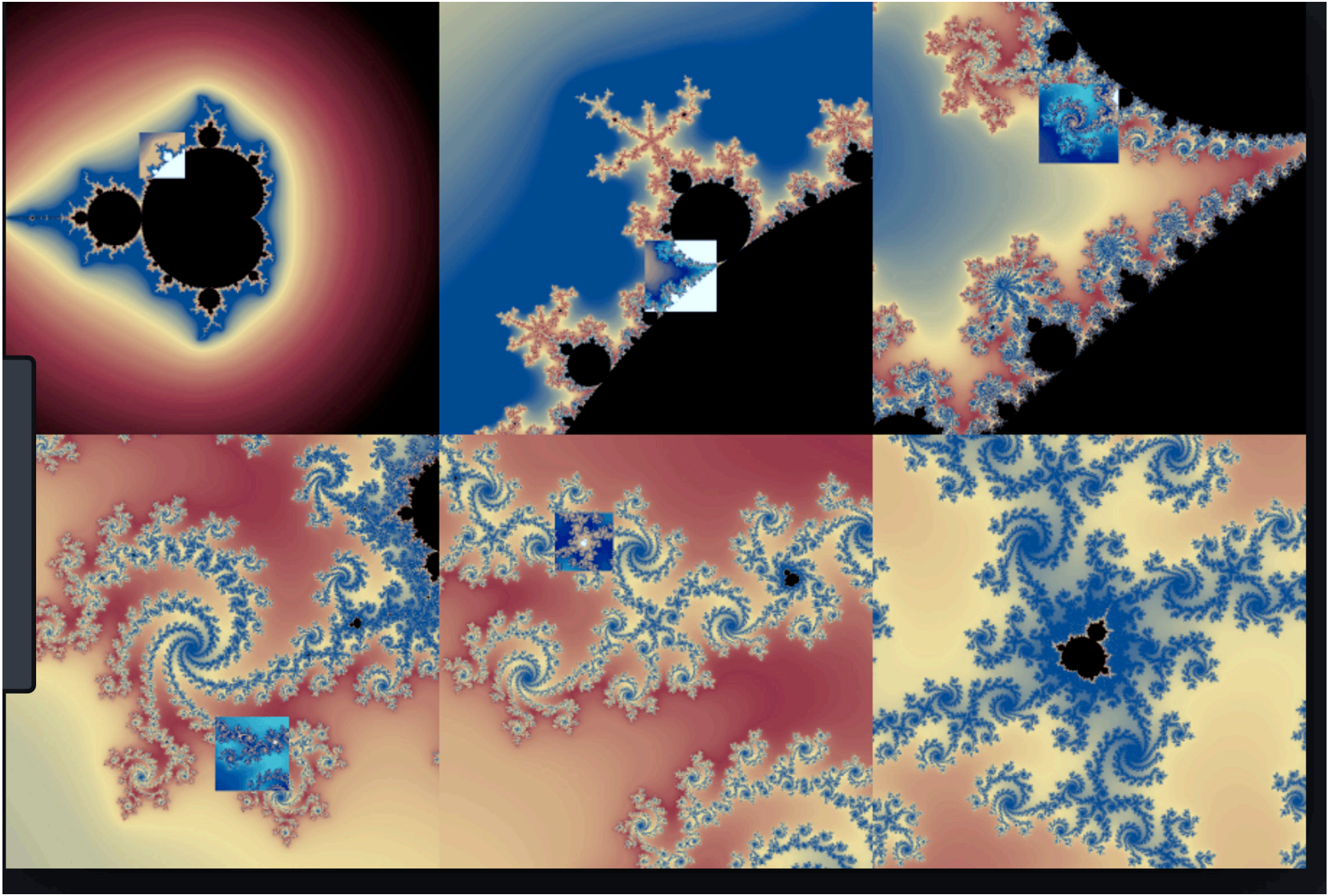



HdWallpapersOnly.com
www.DesktopBackground.org









aurora borealis, or northern lights

Chord & Scale Table™

This table shows how scales harmonize with chords and which chord/scale combinations are most widely played in specific styles of music. (The most commonly played chords and scales are initially shown in CAPITAL LETTERS.) The system works by substituting numbers for the tones of the major scale: DO=1, RE=2, MI=3, FA=4, SO=5, LA=6, TI=7, DO=8 (1) (see *The Table of Keys*).

MAJOR CHORD FAMILY

CHORD TYPE	CHORD FORMULA	CHORD SYMBOL	SCALE	SCALE FORMULA	STYLE
MAJOR	1 3 5	A letter name alone indicates a major chord. **C** All chord symbols are shown in the Key of C.	MAJOR PENTATONIC or MINOR PENTATONIC or MAJOR SCALE	1 2 3 5 6 1 1 ♭3 4 5 ♭7 1 (blues scale add ♭5) 1 2 3 4 5 6 7 1	folk, bluegrass, pop, country, rock, reggae, blues rock, reggae, blues classical, pop
major sixth	1 3 5 6	C6	major pentatonic	1 2 3 5 6 1	folk, country, swing
MAJOR SEVENTH	1 3 5 7	Cmaj 7, CM7 C△7, C7	major scale or lydian mode	1 2 3 4 5 6 7 1 1 2 3 ♯4 5 6 7 1	classical, pop, jazz jazz
major ninth	1 3 5 7 9	Cmaj 9, CM9, C△9			
six-nine	1 3 (5) 6 9	C6/9, C6/9			
add-nine	1 3 5 9	Cadd 9			
major thirteenth	1 3 5 7 (9) 13	Cmaj13, C△13			
suspended second	1 2 5	Csus2, Cs2	major pentatonic, no third, add 4	1 2 4 5 6 1	country, rock, pop, gospel
suspended fourth	1 4 5	Csus4, Cs4			
major seven-flat-five	1 3 ♭5 7	Cmaj 7♭5, C△7♭5	lydian mode	1 2 3 ♯4 5 6 7 1	jazz

MINOR CHORD FAMILY

MINOR	1 ♭3 5	Cmin, Cm, C–	minor pentatonic or DORIAN MODE or AEOLIAN MODE (natural minor)	1 ♭3 4 5 ♭7 1 1 2 ♭3 4 5 6 ♭7 1 1 2 ♭3 4 5 ♭6 ♭7 1	folk, classical, country, bluegrass, rock, reggae, blues, pop classical, country, rock, pop, latin, jazz, blues classical, pop, jazz,
MINOR SEVENTH	1 ♭3 5 ♭7	Cmin7, Cm7, C–7			
minor ninth	1 ♭3 5 ♭7 9	Cmin9, Cm9, C–9			
minor eleventh	1 ♭3 5 ♭7 (9) 11	Cmin11, Cm 11, C–11			
minor sixth	1 ♭3 5 6	Cmin6, Cm6, C–6	minor pentatonic or dorian mode	1 ♭3 4 5 ♭7 1 (blues scale add ♭5) 1 2 ♭3 4 5 6 ♭7 1	rock, pop, jazz classical, rock, pop, latin, jazz,
minor six-nine	1 ♭3 (5) 6 9	Cm6/9, Cm6/9			
minor thirteenth	1 ♭3 5 ♭7 (9)(11) 13	Cmin 13, Cm13, C–13			
minor seven-flat-five (half-diminished)	1 ♭3 ♭5 ♭7	Cm7♭5, C$^{\varnothing}$	locrian mode	1 ♭2 ♭3 4 ♭5 ♭6 ♭7 1	jazz
minor-major seven	1 ♭3 5 7	Cm(maj7), Cm△, Cm(M7), Cm7	melodic minor	1 2 ♭3 4 5 6 7 1	

DOMINANT CHORD FAMILY

SEVENTH	1 3 5 ♭7	C7 (dominant 7th)	MIXOLYDIAN MODE or minor pentatonic	1 2 3 4 5 6 ♭7 1 1 ♭3 4 5 ♭7 1	classical, folk, country, rock, latin, pop, jazz rock, blues
ninth	1 3 5 ♭7 9	C9, (C7 add 9)	mixolydian mode	1 2 3 4 5 6 ♭7 1	rock, pop latin, jazz
eleventh	1 (3) 5 ♭7 (9) 11	C11			
thirteenth	13 5♭7 (9)(11) 13	Cmin11, Cm 11, C–11			
seven-flat-five	1 3 ♭5 ♭7	C7♭5, C7–5	mixolydian sharp-four	1 2 3 ♯4 5 6 ♭7 1	pop, jazz
seven-sharp-five (augmented seventh)	1 3 ♯5 ♭7	C 7♯5, C7+5 C aug 7, C+7	whole-tone scale diminished/whole-tone	1 2 3 ♭5 ♯5 ♭7 1 1 ♭2 ♭3 3 ♭5 ♯5 ♭7 1	
seven-flat-nine	1 3 5 ♭7 ♭9	C7♭9, C7-9	half-whole diminished	1 ♭2 ♭3 3 ♭5 5 6 ♭7 1	
seven-sharp-nine	1 3 5 ♭7 ♯9	C7♯9, C7+9	diminished/whole-tone	♭2 ♭3 3 ♭5 ♯5 ♭7 1	
any combination of the above four chords		7♭5♭9, 7♭5♯9 7♯5♭9, 7♯5♯9	diminished/whole-tone	1 ♭2 ♭3 3 ♭5 ♯5 ♭7 1	

AUGMENTED & DIMINISHED

augmented	1 3 ♯5	Caug, C+	whole-tone scale	1 2 3 ♭5 ♯5 ♭7 1	pop, jazz
diminished	1 ♭3 ♭5	Cdim, C$^{\circ}$	diminished/whole-tone	1 ♭2 ♭3 3 ♭5 ♯5 ♭7 1	
diminished seven	1 ♭3 ♭5 ♭♭7	Cdim7, C$^{\circ}$7	half-whole-diminished whole-half-diminished	1 ♭2 ♭3 3 ♭5 5 6 ♭7 1 1 2 ♭3 4 ♭5 ♯5 6 7 1	

blues scale = 1 ♭3 4 ♭5 5 ♭7 1 harmonic minor = 1 2 ♭3 4 5 ♭6 7 1 phrygian mode = 1 ♭2 ♭3 4 5 ♭6 ♭7 1

0 38081 35736 2 87-32820 US $9.99
Distributed by Alfred.
ISBN-10: 0-7390-6151-8
ISBN-13: 978-0-7390-6151-0
9 780739 061510 50999

Theory & Transposing Guide™

Table of Keys™

MAJOR SCALE 1 2 3 4 5 6 7 1	DO		RE		MI	FA		SO		LA		TI	DO
	whole-step		whole		half-step	whole		whole		whole		half	
UNIVERSAL KEY (scale degrees)	1	(♭9) ♭2	2	(9) (♯9) ♯2 / ♭3	3	4	(11) (♯11) ♯4 / ♭5	5	♯5 / ♭6	6	(13) ♭7	7	1 (8)
	TONIC	12 half-steps in each octave (chromatic scale)											OCTAVE
Key of C	C	D♭	D	D♯ E♭	E	F	F♯ G♭	G	G♯ A♭	A	B♭	B	C
Key of D♭	D♭	E𝄫	E♭	E F♭	F	G♭	G A𝄫	A♭	A B𝄫	B♭	C♭	C	D♭
Key of D	D	E♭	E	E♯ F	F♯	G	G♯ A♭	A	A♯ B♭	B	C	C♯	D
Key of E♭	E♭	F♭	F	F♯ G♭	G	A♭	A B𝄫	B♭	B C♭	C	D♭	D	E♭
Key of E	E	F	F♯	F𝄪 G	G♯	A	A♯ B♭	B	B♯ C	C♯	D	D♯	E
Key of F	F	G♭	G	G♯ A♭	A	B♭	B C♭	C	C♯ D♭	D	E♭	E	F
Key of F♯	F♯	G	G♯	G𝄪 A	A♯	B	B♯ C	C♯	C𝄪 D	D♯	E	E♯	F♯
Key of G♭	G♭	A𝄫	A♭	A B𝄫	B♭	C♭	C D𝄫	D♭	D E𝄫	E♭	F♭	F	G♭
Key of G	G	A♭	A	A♯ B♭	B	C	C♯ D♭	D	D♯ E♭	E	F	F♯	G
Key of A♭	A♭	B𝄫	B♭	B C♭	C	D♭	D E𝄫	E♭	E F♭	F	G♭	G	A♭
Key of A	A	B♭	B	B♯ C	C♯	D	D♯ E♭	E	E♯ F	F♯	G	G♯	A
Key of B♭	B♭	C♭	C	C♯ D♭	D	E♭	E F♭	F	F♯ G♭	G	A♭	A	B♭
Key of B	B	C	C♯	C𝄪 D	D♯	E	E♯ F	F♯	F𝄪 G	G♯	A	A♯	B
UNIVERSAL KEY (chord function)	I	♭II	II	♭III	III	IV	♭V	V	♭VI	VI	♭VII	VII	I

THE UNIVERSAL KEY is a musical numbering system based on the major scale that uses numbers instead of letters to identify the notes of the scale: DO=1, RE=2, MI=3, FA=4, SO=5, LA=6, TI=7, DO=8(1).
ROMAN NUMERALS: Professional studio musicians, who must be able to play on sight from chord charts in any key, often use a handy system of music notation known as "the Nashville system" for writing and playing chord charts. The Roman numerals (I, IV, V, etc.) represent major chords built off any scale degree; other chords are shown by a Roman numeral followed by the abbreviation for that chord type. For example, IVm is a minor chord with the fourth degree of the major scale as the root. In the Key of D, the IVm chord is G-minor; in the Key of B, the IVm chord is E-minor.

Castalia Communications, Petaluma, CA © 1980–2009 • All rights reserved. • www.castaliapub.com